

Pharmaceutical Waste Management -- An Update for MWPAAC

May 28, 2008

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King County DNRP**

**Local Hazardous Waste Management Program
in King County**



A timely subject...

AP: Drugs found in drinking water

Updated 31d ago | Comments

147 | Recommend 76

Hormonal chemicals may be imperiling fish

PERVASIVE IN AREA'S WATER | Even at the low levels detected, scientists worry about the possible effect on fish growth and reproduction.

BY WARREN CORNWALL AND
KEITH ERVIN
Seattle Times staff reporters

As they swim deep beneath Seattle's Elliott Bay, male English sole carry something in their bodies that's not supposed to be there: a protein

fish, first found in the 1990s, are thought to be tins of human hormones: hormone-mimicking chemicals — flushed into the water from sewage-treatment plants, factories, storm-water drains and runoff from roads — that had made their reproductive systems go haywire.

Prescription drug overdoses are up 56% since 1997

Gre's were found at road but some sion

Pain pills a rising cause of death

SEATTLE POST-INTELLIGENCER | TUESDAY, APRIL 15, 2008

COMMON ABUSED DRUGS

Generic Name

Common brand names

Buprenex, Subutex, Suboxone

Codeine

Actiq, Sublimaze, Duragesic

Medical indications
Pain, addiction treatment
Pain, cough suppressant
Pain

Drugs in water causing troubling problems to fish, wildlife

OxyContin abuse in region soars

OUTPACING METH | The illicit use of the painkiller, especially among teens, has driven up its street price, which has made pharmacies robbery targets.

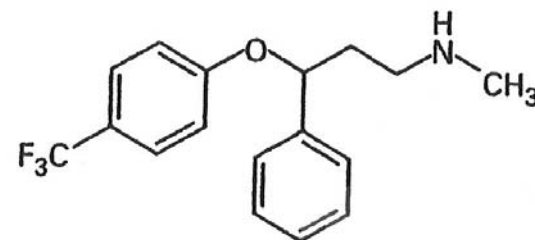
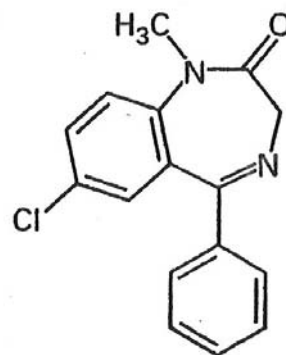
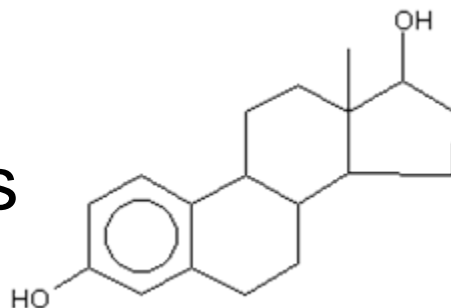
the region say that methamphetamine's popularity is quickly being outpaced by the powerful prescription painkiller simply known as "Oxy."

among teens, Oxy commands a street value of \$80 per pill.

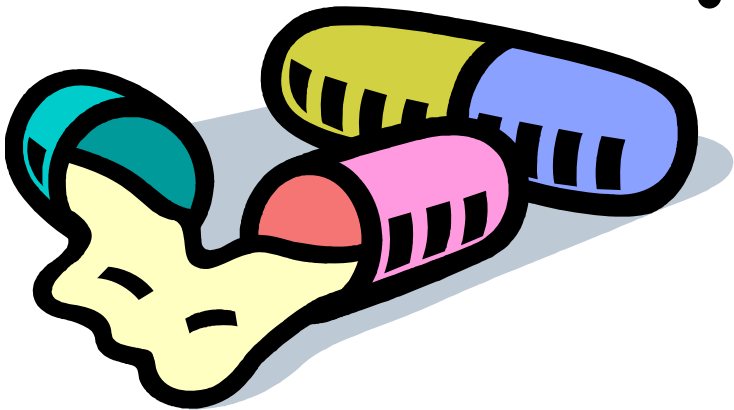
According to the Drug Enforcement Administration (DEA), prescription-drug

Pharmaceuticals

- Antibiotics
- Anti-inflammatories
- Beta-blockers
- Anti-depressants (SSRIs)
- Steroids
- Hormones, estrogen replacements, BC pills
- Chemotherapeutics
- Stimulants
- Etc.



Pharmaceuticals (cont'd)

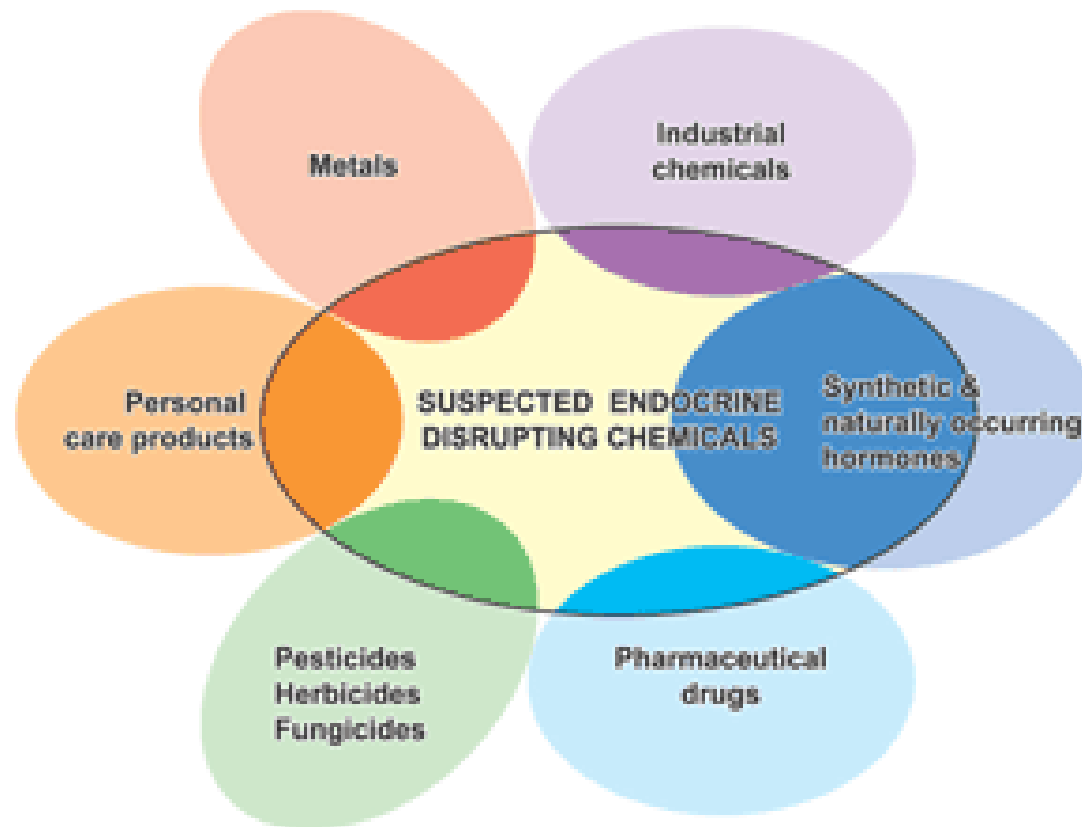


- Wide range of biologically-active chemicals
- Three classes by sale/regulation:
 - Over The Counter
 - Prescription (or “Legend”)
 - Controlled Substances
- Some designate as hazardous waste

Pharmaceuticals (cont'd)

- **Controlled Substances** – regulated by the Federal Drug Enforcement Administration due to potential for abuse
 - Schedule 1 – illegal drugs (ex., heroin, LSD)
 - Schedule 2 – morphine, OxyContin, codeine, Demerol, Ritalin, amphetamines, fentanyl
 - Schedule 3 – Tylenol with codeine, Vicodin
 - Schedule 4 – benzodiazepines, Valium, Darvon
 - Schedule 5 – codeine cough syrups

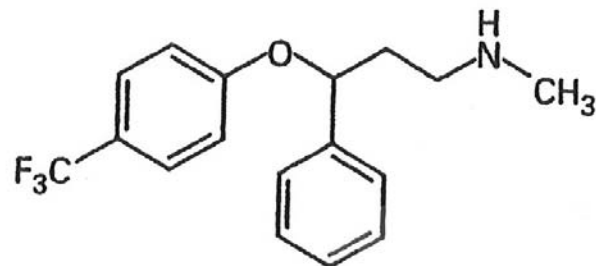
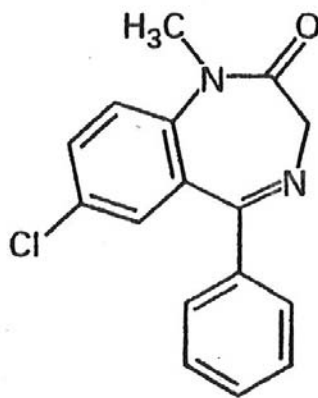
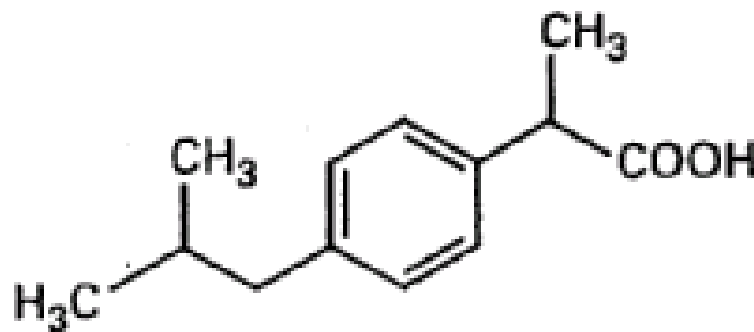
Some Pharmaceuticals are Endocrine Disrupting Chemicals



Some chemicals from the "families" above are potentially endocrine disruptors

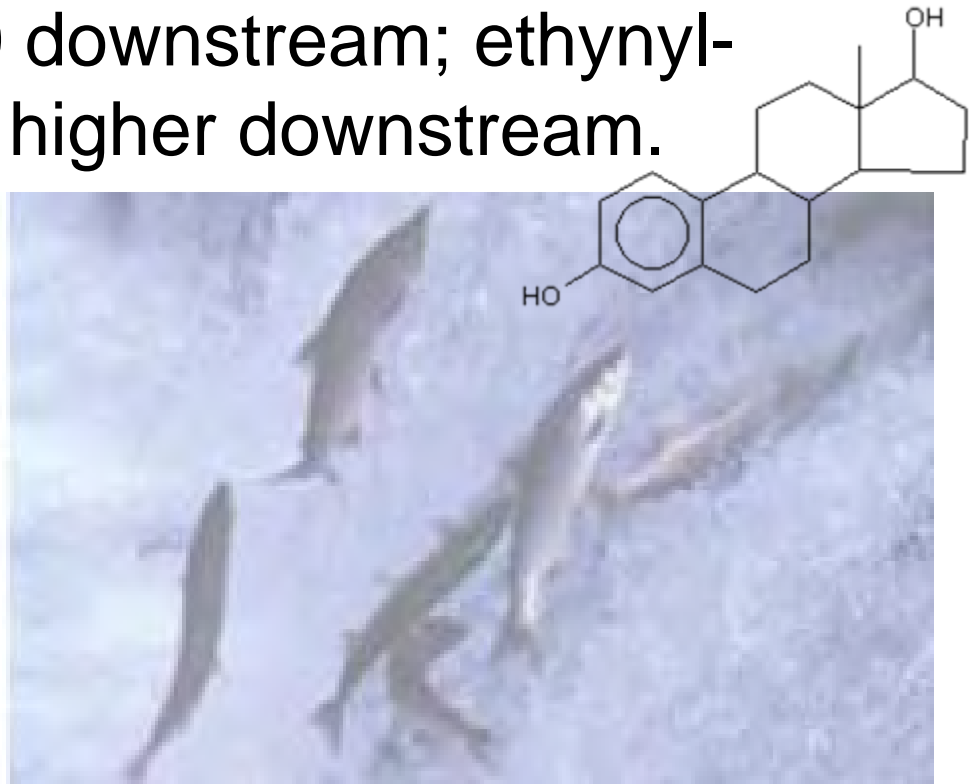
Drugs are showing up in the environment

- Ibuprofen, valium, prozac, antibiotics, steroids, hormones
- Found in 80% of U.S. streams tested by USGS
- Found in drinking water supplies in many U.S. cities



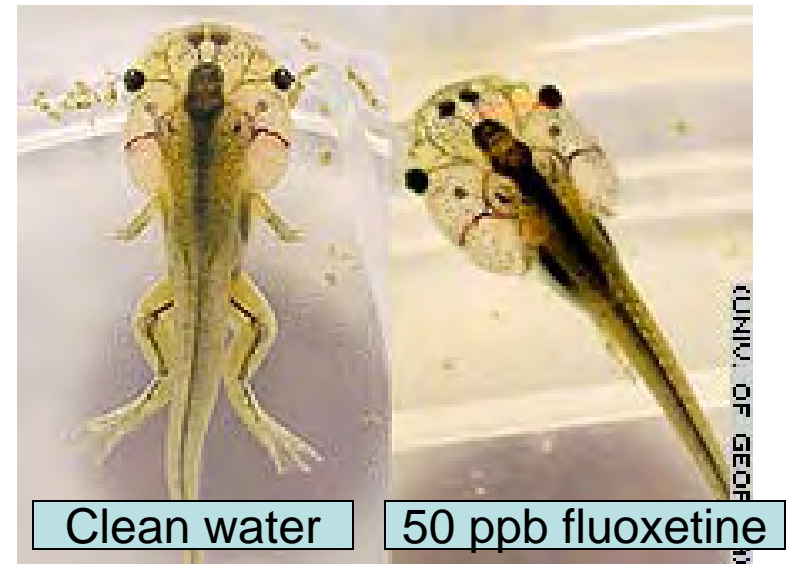
Drugs in the environment (cont'd)

- Antibiotics, hormones, SSRIs are receiving the most attention.
- Boulder Creek, CO, study: 50:50 female:male ratio upstream, 90:10 downstream; ethynyl-estradiol measurably higher downstream.
- Male fish are producing eggs all over the place -- is this a good thing to be more feminine?



Drugs in the environment (cont'd)

- Bioassays of SSRIs are showing some sub-lethal effects at environmentally-relevant levels.



- 2006 Italian study found that a mixture of common drugs at very low (ng/L - environmentally-relevant) concentrations inhibited the growth of human embryonic cells

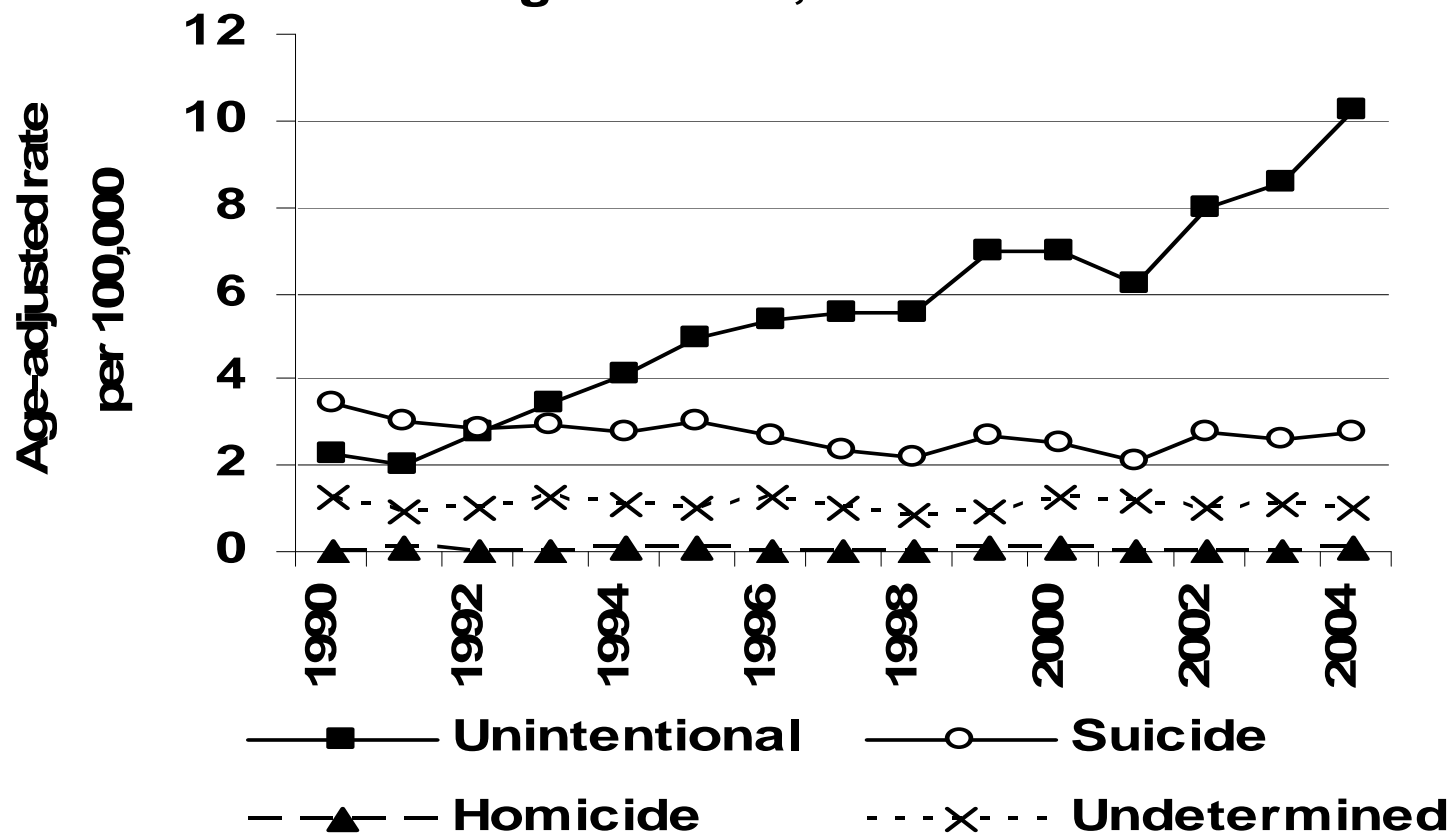
Pharms also present poisoning and abuse hazards

- Most homes have many medicines on the shelves
- Common source of childhood poisonings
- Common source of teenage and adult abuse



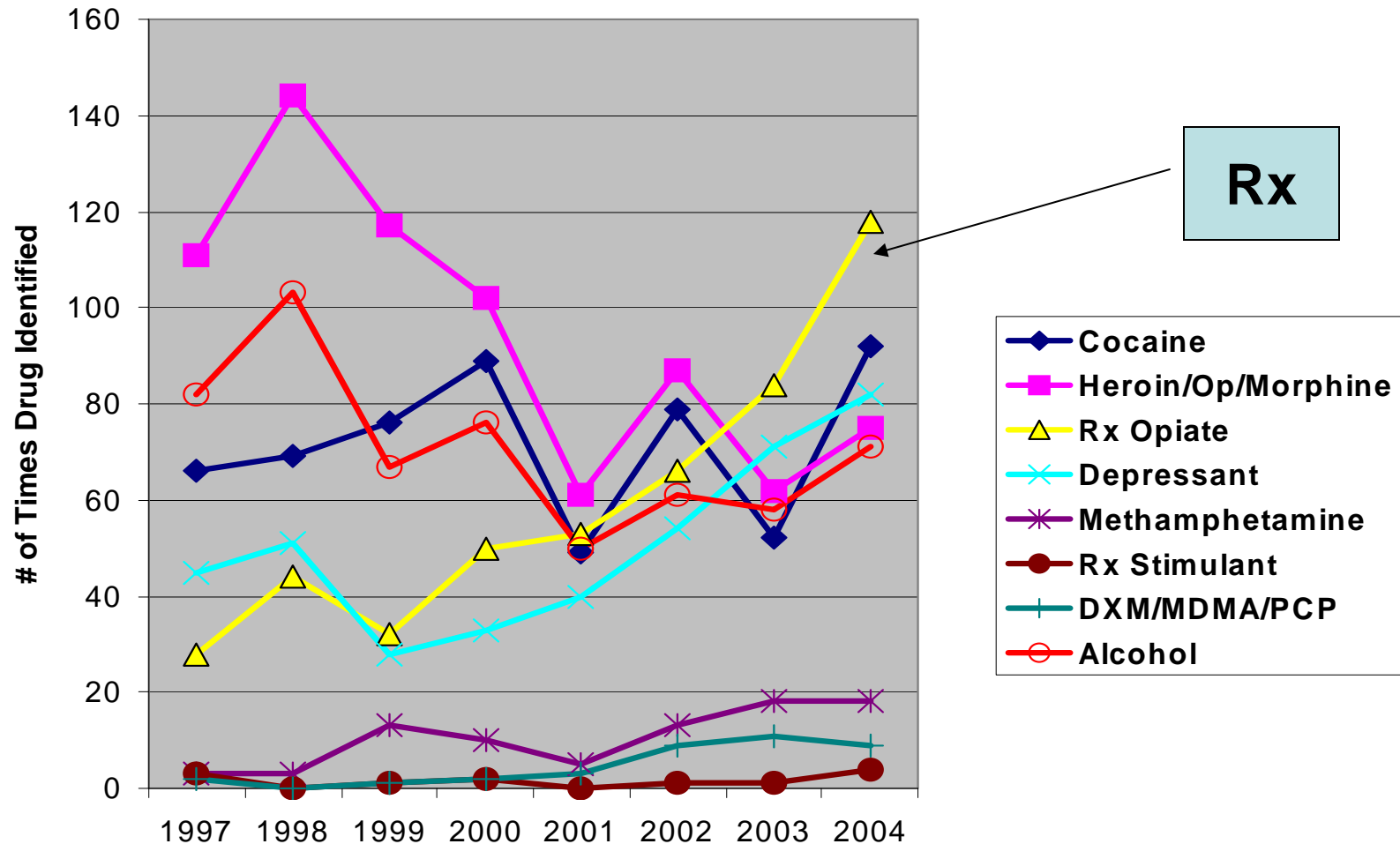
Poisonings

**Poisoning Deaths by Intent
Washington State, 1990 - 2004**



Drug Abuse

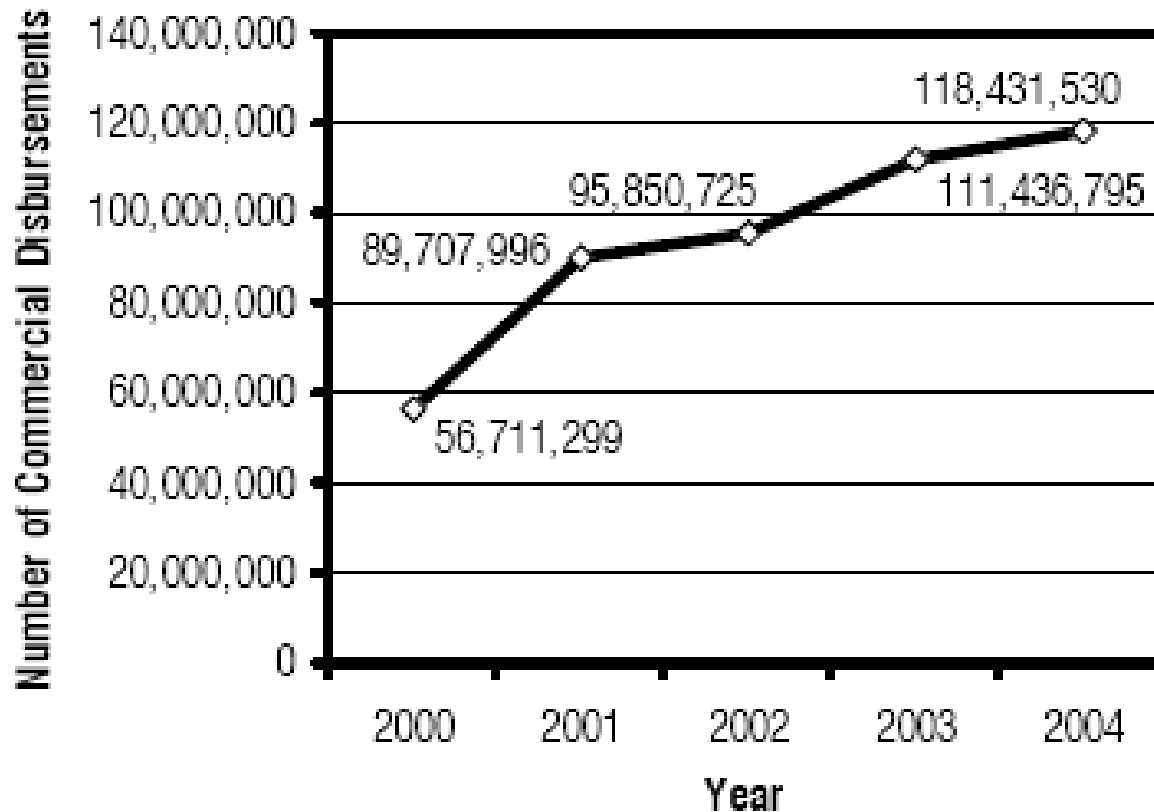
Drug Involved Deaths, King County



Source: Medical Examiner, Public Health & Seattle-King County.

Drug sales keep going up

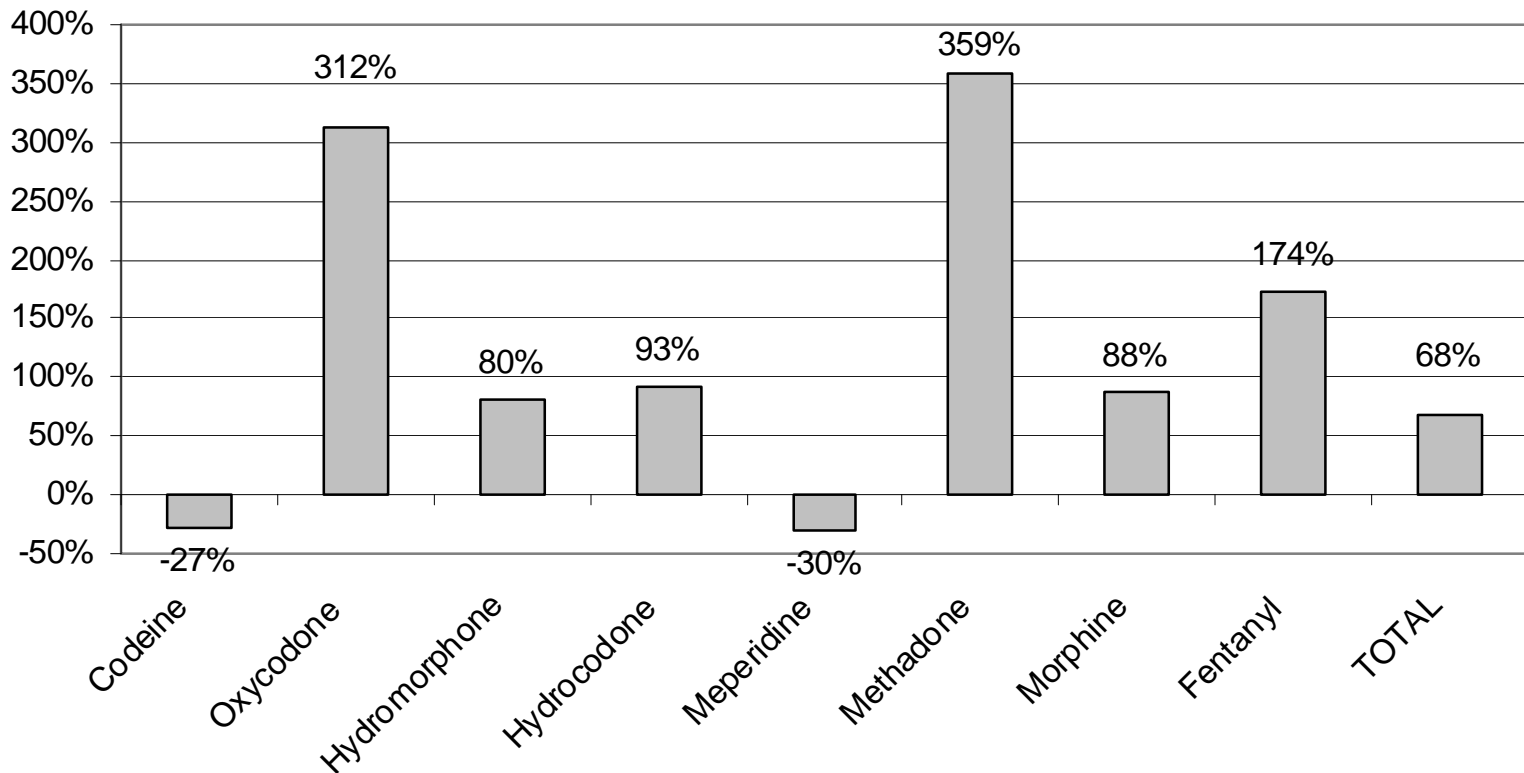
U.S. sales have more than doubled in last 5 yrs



(Ref: National Drug Intelligence Center, 2005, via Ilene Ruhoy, 2006)

Increased Sales (cont'd)

Prescription Opiates Sold in King County Percent Change 1997-2003



Source- ARCOS/DEA Data for Zip Codes 980xx and 981xx, which approximates King County boundaries

http://www.deadiversion.usdoj.gov/arcos/retail_drug_summary/index.html

Drug marketing is big business

- 2004 estimate of total pharmaceutical promotion expenditures in the U.S.:

\$57.5 billion



That's \$1.15 billion in Washington State!

[Source: Gagnon and Lexchin, 2008]

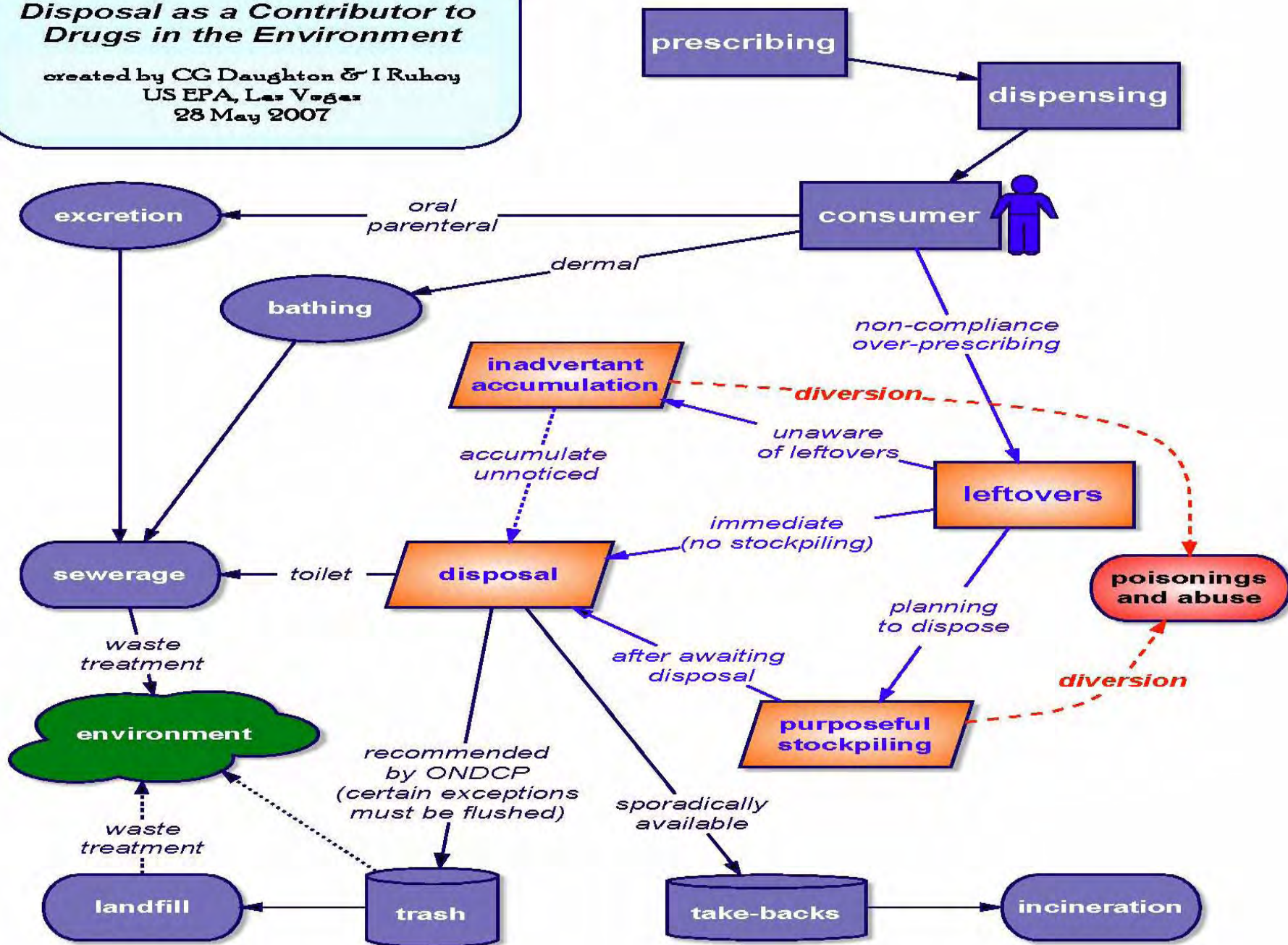
Drugs enter the environment through use and disposal

- Probably most result from use, passing through us un-metabolized, then going through wastewater treatment systems
- Unused/unwanted quantities could be huge, as much as 50% of many prescriptions (80% for antibiotics)
- Common/historical recommendation was to flush; “crush&flush” is still widely practiced method



Disposal as a Contributor to Drugs in the Environment

created by CG Daughton & I Ruhoy
US EPA, Las Vegas
28 May 2007



Pharms are present in wastewater treatment systems

- EPA, USGS and other studies are finding pharmaceuticals in all systems sampled
- 5-POTW study in NE found 38 pharms: naproxen, ibuprofen, acetaminophen, ...
- 10-POTW study in U.S. found 78 of 110, found pharms in effluents and downstream



Pharms are present (cont'd)

- Sequim study by Ecology:
 - 2 tertiary effluents sampled, plus nearby streams and wells.
 - Found 16 of 24 compounds in effl.: acetaminophen, carbamazepine, cimetidine, codeine, cotinine, diltiazem, hydrodocone, ketoprofen, metformin, paraxanthine, salbutamol, sulfamethoxazole, trimethoprim, estrone. Also caffeine and nicotine.
 - Metformin (antihyperglycemic) found at unusually high levels in nearby streams and wells as well as effluents



Pharms are present (cont'd)



- No local King County data for our treatment plants
 - focus has been on EDCs
 - analytical methods not yet readily available
- Based on other limited studies to date, we assume pharms are present

Pharm treatability?

- Wide range of chemicals
- Many studies underway (EPA, WERF, ...)
- Conventional activated sludge and MBR show good, mixed removals
- Longer solids retention time often leads to greater removals
 - Trade-off with energy and cost





Proper Disposal of Prescription Drugs

Office of National Drug Control Policy February 2007

Federal Guidelines:

- Take unused, unneeded, or expired prescription drugs out of their original containers and throw them in the trash.
- Mixing prescription drugs with an undesirable substance, such as used coffee grounds or kitty litter, and putting them in impermeable, non-descript containers, such as empty cans or sealable bags, will further ensure the drugs are not diverted.
- Flush prescription drugs down the toilet *only* if the label or accompanying patient information specifically instructs doing so (see box).

- Take advantage of community pharmaceutical take-back programs that allow the public to bring unused drugs to a central location for proper disposal. Some communities have

The FDA advises that the following drugs be flushed down the toilet instead of thrown in the trash:

Actiq (fentanyl citrate)

Daytrana Transdermal Patch (methylphenidate)

Duragesic Transdermal System (fentanyl)

OxyContin Tablets (oxycodone)

(hydrocodone sulfate)

Avin:

Bara

Rev:

Office of National Drug Control Policy

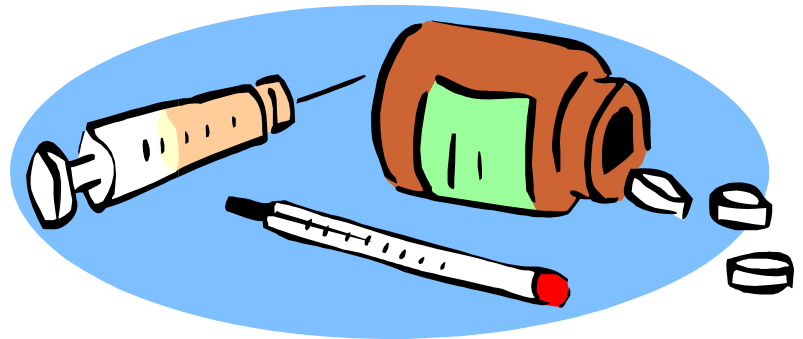
ONDCP, Washington, D.C. 20503

p (202) 395-6618 f (202) 395-6730



Solutions?

- Decrease sales, increase compliance, reduce accumulations, produce less waste (save \$\$ too).
- Reduce diversion in the home – time for locked medicine cabinets?
- Provide system(s) for safe, legal, green handling of unused medicines.



Household Pharmaceutical Waste Options

- Reduce first
- Reuse, Recycle -- NO
- Flush – NO
- Trash – better than flush, but diversion and environmental issues still prevail
- Special collection, take-back or other approaches needed



Models/pilot projects

- One-day collection events
- Household hazardous waste services
- Drop-off at police or sheriff offices
- Mail-back
- Drop-off/take-back at pharmacies



Pharmacy Take-Back Pilot Project in WA

PH:ARM = “Pharmaceuticals
from Households: A
Return Mechanism”



<http://www.medicinereturn.com>





Group Health bin sign

Medication Disposal Unit

What to do:

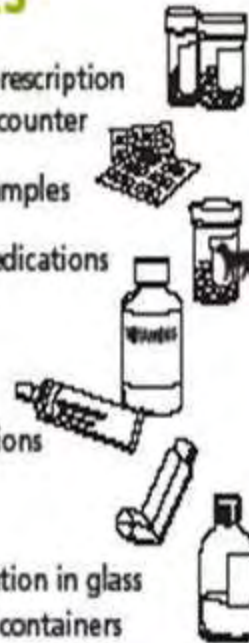
1. Gather your unwanted medications and other approved items (see list). Leave items in the original containers. Mark out any personal information if you wish.
2. Bring items to this pharmacy. Deposit into this medication disposal unit.



What items can you return for safe disposal?

Return YES

- Medication: prescription and over-the-counter
- Medication samples
- Veterinary medications
- Vitamins
- Medicated ointments/lotions
- Inhalers
- Liquid medication in glass or leak-proof containers



Do not return NO

- Needles
- Thermometers
- IV bags
- Bloody or infectious waste
- Personal care products
- Controlled substances (narcotics)
- Hydrogen peroxide
- Empty containers
- Business waste
- Aerosol cans



For questions, please contact your pharmacist.









PH:ARM update

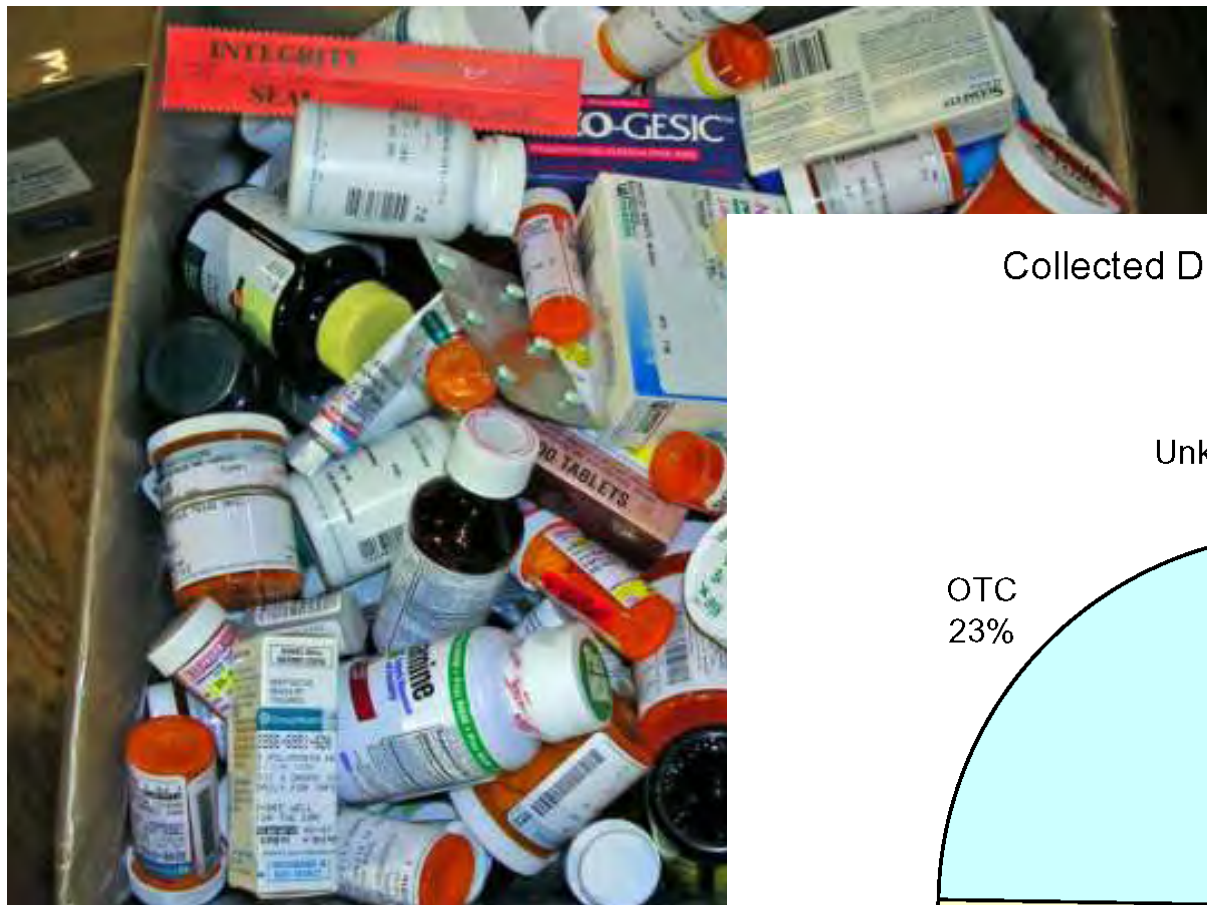


- 24 Group Health locations open across state, 11 in King County
- 2 new Bartell Drug sites open, more to follow
- 9,000 lbs. collected to date
- qualitative inspection of buckets finding minimal contamination
- All drugs destroyed at Spokane's WTE facility

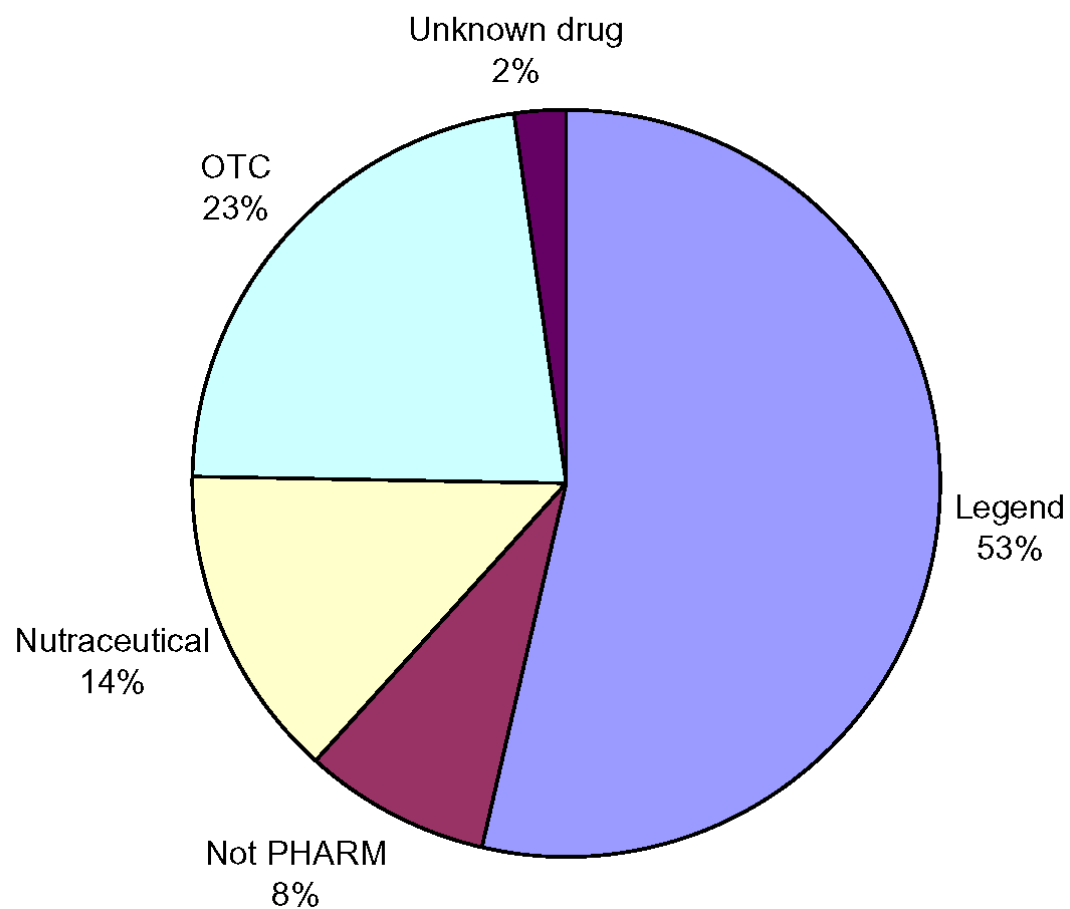
1 cage fills every 3 days







Collected Drugs, Percent by Weight



Best approach: product stewardship

Waste Management Act
**POST-CONSUMER RESIDUAL STEWARDSHIP
PROGRAM REGULATION**
(includes amendments up to B.C. Reg. 21)

Contents

Part 1 — Introduction

- 1 Definitions
- 2 Duty of a brand-owner
- 3 Duty of an association
- 4 Annual report by the director

Part 2 — Stewardship Program

- 5 Approval of a stewardship program
- 5.1 Exemption of paint stewardship program under the Stewardship Program Regulation from refiling it
- 6 Timelines
- 7 Written reasons required

Part 3 — Stewardship Requirements

- 8 Application of stewardship requirements

Product Category
Solvent and flammable liquids
Pesticide
Gasoline
Pharmaceutical
Lubricating oil
Empty oil container
Oil filter
Paint



BRITISH
COLUMBIA



Return
Unwanted
Medicines

[About Us](#) [Background](#) [Consumer Awareness](#) [Collections](#) [Protocols](#) [Media Releases](#) [Links](#) [Contacts](#)

Unwanted Medicines are a Household Hazard



The National Return and Disposal of Unwanted Medicines Ltd. known as the RUM program, is a national not-for-profit company, set up to enable consumers to return unwanted or out-of-date medicines to any pharmacy, at any time. The medicines returned are in no way reused or recycled.

COLLECTION PROTOCOL
Consumers will be encouraged to return their unwanted and out of date medicines to their local pharmacies.
>>click here for more

PROTOCOL FOR PHARMACISTS
At commencement of the



PRODUCT
STEWARDSHIP
INSTITUTE

Sustainable Solutions to Protect Our Environment

Product Stewardship Elsewhere

Many Products

- Pharmaceuticals
- Paint
- Pesticides
- Batteries
- Thermostats
- Tires
- Mercury Switches in Cars
- Vehicles
- Electronics
- Cell phones
- Beverage Containers
- Packaging
- and more



Many Places

- BC
- And all across Canada
- European Union
- Japan
- Taiwan
- South Korea
- Australia
-and more



PSI Pharmaceutical Dialogue



- Action Plan – draft imminent
- First dialogue meeting: Sacramento, CA
June 19-20, 2008
- National dialogue aimed at reaching
agreement on a national solution

WA Legislation pending

H-5015.1

SUBSTITUTE HOUSE BILL 3064

State of Washington

60th Legislature

2008 Regular Session

By House Select Committee on Environmental Health (originally sponsored by Representatives Morrell, Green, Appleton, Seaquist, VanDeWege, Upthegrove, Lantz, Kenney, Roberts, Simpson, Hunt, O'Brien, Linville, Ormsby, Wood, Campbell, Jarrett, and Hudgins)

READ FIRST TIME 02/04/08.

1 AN ACT Relating to providing safe collection and disposal of
2 unwanted drugs from residential sources through a producer managed and
3 funded product stewardship program; amending RCW 18.64.165; adding new
4 sections to chapter 18.64 RCW; adding a new chapter to Title 70 RCW;
5 prescribing penalties; and providing an effective date.

6 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

7 NEW SECTION. Sec. 1. The legislature finds that a convenient,
8 safe, secure, and environmentally sound product stewardship program for
9 the collection, transportation, and disposal of unwanted drugs from
10 residential sources may help to avoid accidental poisonings, decrease

In closing...

- A complex, “emerging” issue
- It'll be years before we understand the impacts/effects
- Source control where practicable makes sense
- Partner with poisoning/abuse programs to launch take-back for unused/waste medicines



For more information

- www.medicinereturn.com
- Dave.Galvin@kingcounty.gov

